

Fiant, Kevin

From: Vest-Boratyn, Pamela
Sent: Tuesday, October 13, 2020 6:21 PM
To: Fiant, Kevin; Wood, Howard
Subject: FW: FCC DOT Waiver Request (US-33 Smart Mobility Corridor DSRC RSU's)

Importance: High

Categories: US-33 Tech Corridor

fyi

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Sent: Tuesday, October 13, 2020 6:18 PM
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Cc: Renee Roland <Renee.Roland@fcc.gov>; Roberto Mussenden <Roberto.Mussenden@fcc.gov>; Brian Marengo <Brian.Marengo@fcc.gov>; Vest-Boratyn, Pamela <Pamela.Vest-Boratyn@dot.ohio.gov>; Makowski, Richard <Richard.Makowski@dot.ohio.gov>; Blackford, Mitchell <Mitch.Blackford@dot.ohio.gov>
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Mr. Wilhelm:

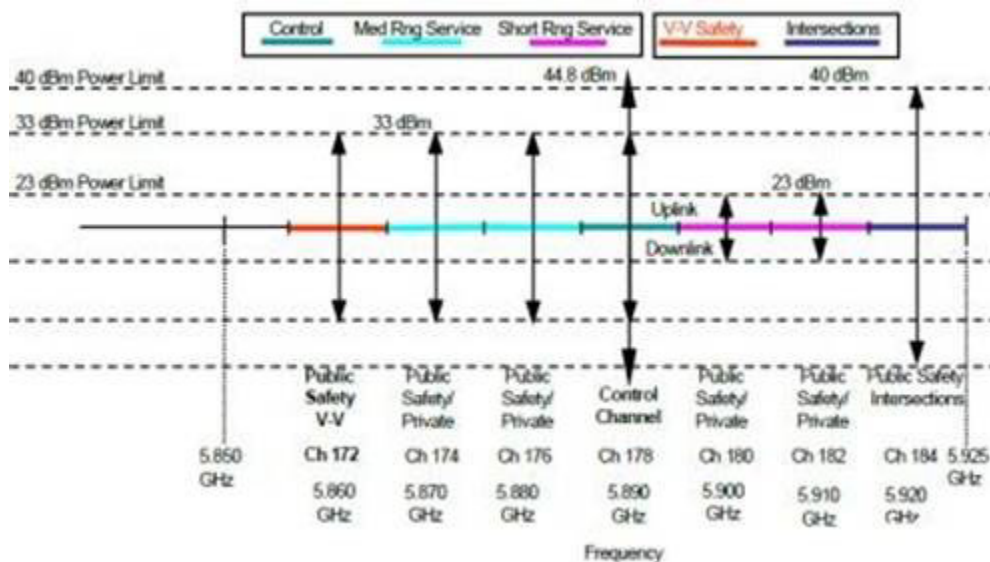
Forgive the lateness of my response. A groundbreaking Ohio DOT had with local infrastructure partners on a US 40 (National Road) project near the I-70/I-75 system interchange in Vandalia, Ohio kept me away from the office until just a few minutes ago.

I have discussed the questions you posed for clarification related to the FCC DOT Waiver request both internally among ODOT US 33 Smart Mobility personnel and the consultant Project Manager. Below please find ODOT's response:

1. In the pending notice of proposed rulemaking for the 5.9 GHz band, the Commission is examining whether to limit DSRC use of the band to a 30 MHz segment at 5.895-5.925 GHz. Note that four of the five channels that DOT proposes to use fall outside the 5.895-5.925 GHz ITS allocation proposed by the Commission, i.e., Channels 172, 174, 176 and 178. The DOT waiver request states that there is "no reasonable alternative" to DOT's use of Channels 172, 174, 176, 178 and 180. Please respond with the reasons, technical or otherwise, why DOT cannot exercise the alternative of confining its operations to the 5.895-5.925 GHz band segment. It will be helpful if you are as complete as possible in your response and that you support it with all relevant documentation.

Our belief is that having the full spectrum of the 5.9 GHz band is critical for achieving the goals of the US 33 Smart Mobility Corridor (US 33 SMC) and the fully supported USDOT Advanced Transportation Congestion Management Technologies Deployment Grant.

First, Dedicated Short Range Communication (DSRC) was designed for a multi-channel environment with different channels fulfilling different roles such as safety, control, and service, with varying power-levels assigned per channel, all part of a design intended to maximize spectrum utilization and minimize interference, both from other DSRC devices using the same spectrum, and more importantly, other devices using adjacent channels. Further, it uses two radios simultaneously, one to support critical safety functions, and the other to support other safety, mobility and security needs. Per the current design, and as intended for use on the US 33 SMC, Channel 172 is dedicated to crash-imminent safety. This channel is protected from adjacent channel inference from the UNII-3 band by a 5 MHz guard band on the lower end of the spectrum. Channel 178 is dedicated as a control channel to allow for non-safety critical but required functions to still operate and not impact the safety function. For the US 33 SMC, Channel 178 includes additional safety messages such as the roadside safety message, lane closures, emergency vehicle alerts and more. Channel 178 also serves to direct approaching vehicles to other channels in the spectrum where critical updates to on-board safety equipment firmware, security certificates, and other necessary operations are available. The separation between Channels 172 and 178 provides the necessary isolation to minimize interference between the two channels. When a device needs to access a service on another channel, it first checks Channel 178 and then temporarily connect to one of the service channels, in this case, Channels 174, 176 or 180. By using three services channels, the Ohio Department of Transportation (ODOT) can deploy DSRC Roadside Units (RSUs) at the desired density along US 33 and still allow for all operations to occur, without interference. Moving DSRC to a single channel (Ch. 180), or even three channels (Ch. 180, 182 and 184) has not been proven to be viable due to channel congestion, adjacent-channel interference, limited functionality (loss of control channel / service channel model) and reduced in-channel power, among a few of the unknowns. The figure below shows the vary channel power and utilization that ODOT intends to deploy based on our statewide connected vehicle guidance. Note – ODOT had designed the spectrum mapping specifically to only use five channels and to reserve the upper 10 MHz for Public Safety, as has been the industry practice, and retain a guard band at Channel 182.



Source: NHTSA

Secondly, the project's channelization plan will support over-the-air updates for vehicle on-board unit firmware, security certificates and MAP and infrastructure message information along the entire corridor. The vehicle-to-infrastructure (V2I) environment of the US 33 SMC is designed to support continuous capability for over-the-air updates. As part of the US 33 SMC and supporting ODOT and private sector initiatives, over 1,200 vehicles, specifically targeted for using the US 33 corridor, will be equipped with DSRC On Board Units. The V2I ecosystem is expected to be built out much further, including additional vehicles equipped with on-board units (beyond the 1,200), integrating equipped vehicles from the

nearby Smart Columbus deployment, and developing and deploying additional safety applications. With this expanded ecosystem, it is expected that multiple vehicles simultaneously requiring over-the-air updates will be a frequent occurrence, requiring more than the three channels suggested (Ch. 180, 182 and 184).

Lastly, to date, the DSRC roadside unit and on-board unit procurement, installation, validation and testing plans have all been designed around using Channels 172, 174, 176, 178 and 180. Developing, integrating and testing the equipment using instead only Channel 180 (or Ch. 180, 182 and 184) would incur significant additional costs for this project, (currently being funded through a combination of USDOT, Ohio DOT, and local agency money), and would result in a significant time delay in project completion.

For reference, the National Cooperative Highway Research Program (NCHRP), has published a detailed evaluation and impact of rechannelization and channel limitation on DSRC-based V2I programs and deployments. This publication, *V2X Communications in the 5.9 GHz Spectrum*, can be found at the following link:

<http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP23-10-V2XCommunicationsMarch2020Update.pdf>

- 2. The waiver request recites that “the DSRC units are being deployed specifically for testing” which suggests that DOT could request an experimental authorization, which, if granted by the Commission’s Office of Engineering and Technology, might allow use of your requested channels for a limited period. Would DOT consider requesting an experimental authorization?**

Yes, the Ohio DOT would consider proceeding with Experimental Authorization requesting channels 172, 174, 176, 178, and 180. Given that 47 CFR 5.54 presents many categories of experimental broadcast authorizations with different qualifications and life spans, it would be helpful if the FCC would provide further clarification on what form of experimental authorization would be considered under the federal regulation. Can you please provide more information?

Thank you for your assistance and consideration, and please let us know if we can provide any further information.

Respectfully,

Jack

Jack Marchbanks, PhD, MBA

Director

